Florida Department of Environmental Protection

Stream Habitat Assessment Procedure

Aquatic Ecology and Quality Assurance

2018





What is a Habitat Assessment?

- ✓Companion field method to the SCI.
- ✓Evaluation of habitat quality in a stream.
- ✓Critical to any assessment of ecological integrity.
- ✓Should be performed with all biological sampling.
- ✓Incorporates all aspects of physical and chemical components along with the biotic interactions.
- ✓Results will assist in interpreting biological data.

Optimal | Suboptimal | Marginal | Poor

- 160-121
- 120-81
- 80-41
- 40-11

Primary Components

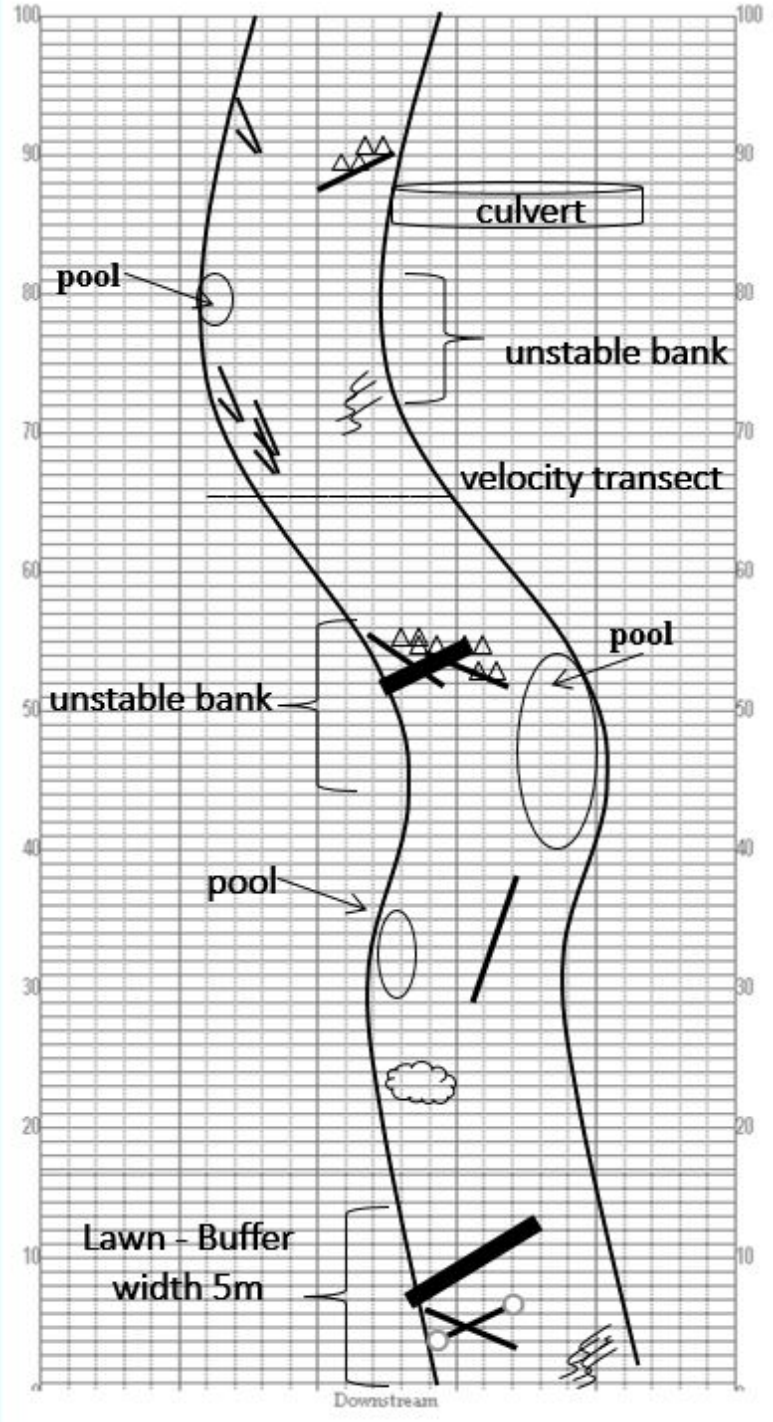
Secondary Components

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** ____	Four or more major productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three major productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two major productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less major productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1
Substrate Availability ____	Greater than 30% major productive habitat present at site 20 19 18 17 16	16% to 30% major productive habitat, by aerial extent 15 14 13 12 11	6% to 15% major productive habitat 10 9 8 7 6	Less than 5% major productive habitat 5 4 3 2 1
Water Velocity ____	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec =0.33 0.31 0.29 0.27 >0.25 20 19 18 17 16	Max. observed at typical transect: >0.1 to 0.25 m/sec 0.25 0.21 0.17 0.13 >0.1 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 0.1 0.09 0.07 0.06 0.05 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec <0.05 0.04 0.03 0.01 <0.01 5 4 3 2 1
Habitat Smothering ____ --------- ------ Primary Score ____	Adequate number of stable pools (1-2 per 12 times width) and <25% of habitats affected by sand, silt, or algae. 20 19 18 17 16	Adequate number of stable pools (1-2 per 12 times width) and >25% of habitats affected by sand, silt, or algae. 15 14 13 12 11	Does not have required number of stable pools (1-2 per 12 x width) and/or has shallow pools (<2 x prevailing depth). 10 9 8 7 6	Stable pools are absent. Most habitats affected by sand, silt, or algae accumulation. 5 4 3 2 1
Secondary Habitat Components **Artificial Channelization** ____	Expected sinuosity given the stream width. No evidence of dredging or artificial straight-ening. No spoil banks. 20 19 18 17 16	Good sinuosity within old chan-nelized area. Evidence of dredging in the past (>25 yrs) but mostly recovered. 15 14 13 12 11	Straightened with trapezoidal cross section, but has a small degree of sinuosity developed within channelized area. 10 9 8 7 6	Straightened or engineered by dredging, has trapezoidal or box cut cross section, lacks required pools. May have spoil banks. 5 4 3 2 1
Bank Stability Right Bank ____ Left Bank ____	Bankfull > 60% of bank height. Slope of bank ≤ 60° from bankful to top of bank. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1
Riparian Buffer Zone Width Right Bank ____ Left Bank ____	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank ____ Left Bank ____ ------ ---------- Secondary Score _____	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants; tree, shrub, and forbs represented, if appropriate). Minimal disturbance. 10 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1

Overview of Habitat Sketch

- ✓ Measure out 100m along the stream.
- ✓ Mark every 10m with flagging tape, making observations as you go.
- ✓ Begin downstream (0m).
- ✓ Draw shape of stream channel.
- ✓ Draw location and type of each habita
- ✓ Show areas of bank instability.
- ✓ Note number and location of pools.
- ✓ Note areas of sand, silt, & algae smothering.
- ✓ Note where riparian zone is <18m

  (roads, paths, clearings, exotic vegetation).



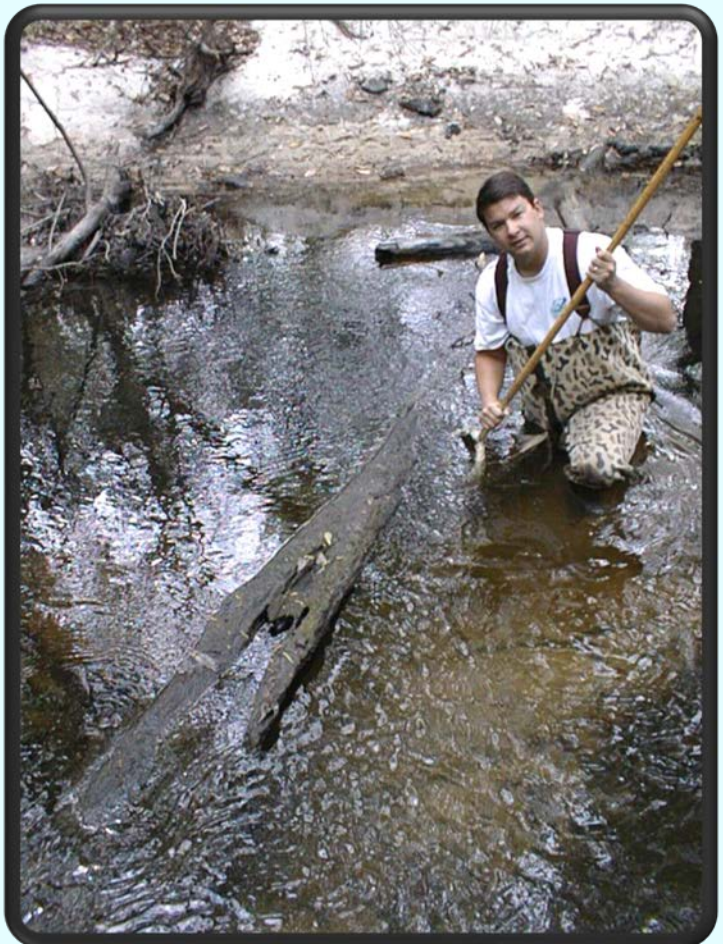
1. Substrate Diversity

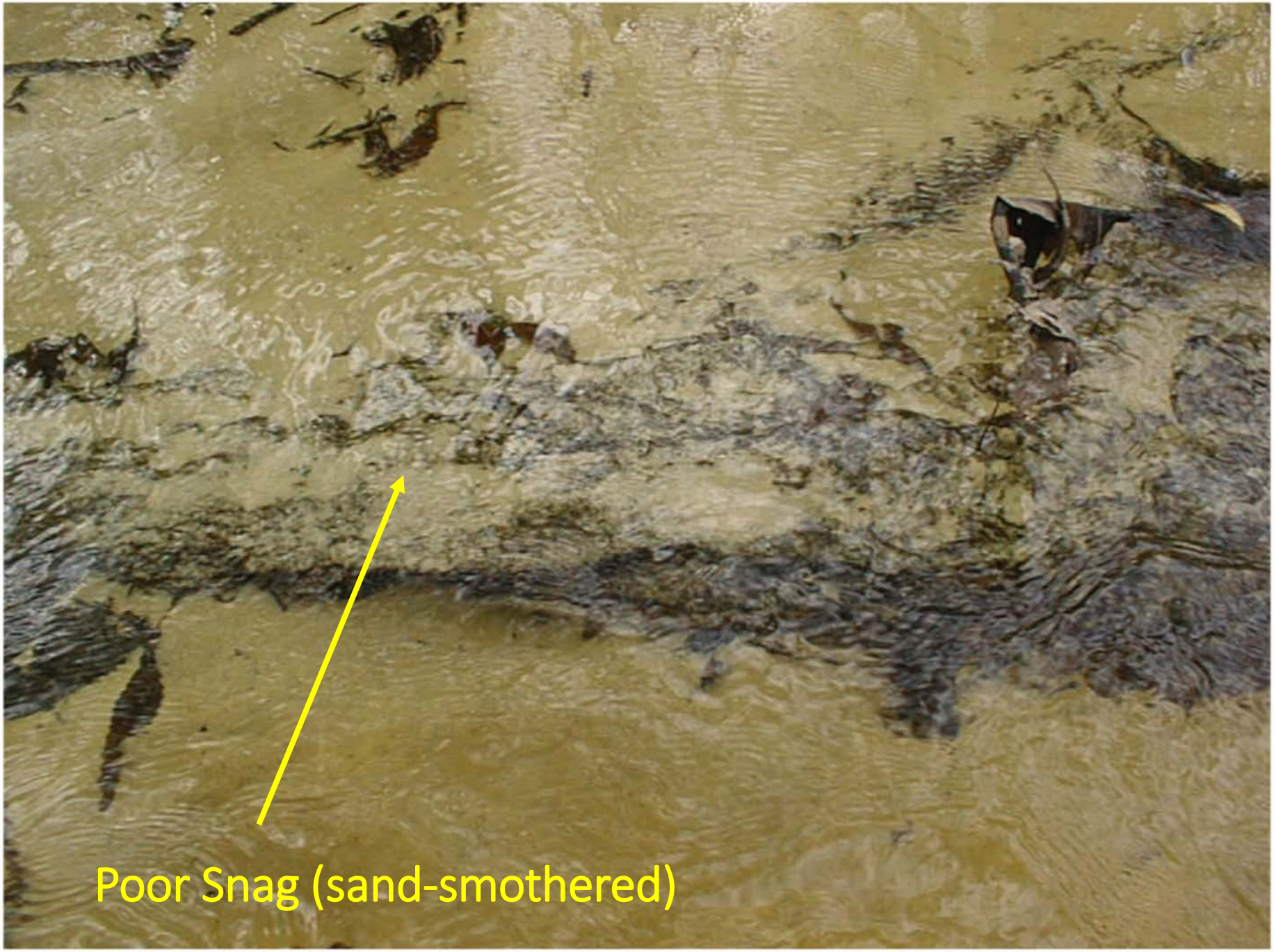
- ✓ **Number** of different **productive** habitats: snags, roots, leaves, aquatic vegetation, rock.
- ✓ **Minimum amount** to be **"major"** = **2 m²** (otherwise a **"minor"** habitat)
- ✓ Factor in quality by scoring within the category chosen above.

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components **Substrate Diversity** ____	Four or more major productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock] 20 19 18 17 16	Three major productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two major productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less major productive habitat. Lack of habitat is obvious, substrates unstable or smothered 5 4 3 2 1

Good Snags

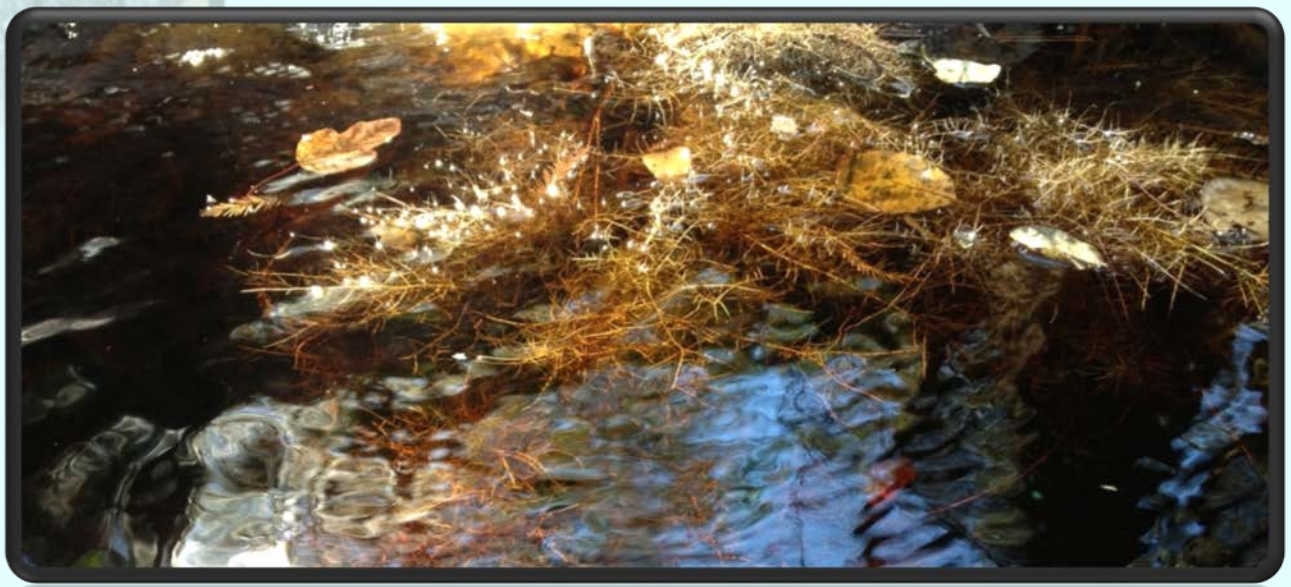
- ✓ In the flow
- ✓ Larger than thumb diameter
- ✓ Have lots of crevices for bugs to hide, peeling bark



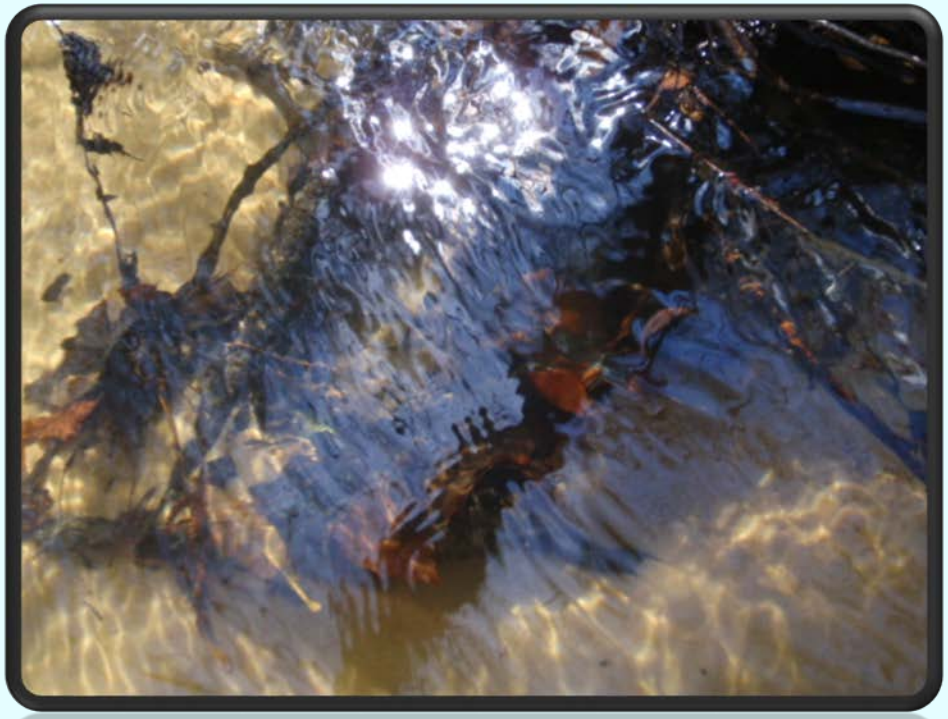

Poor Snag (sand-smothered)

Good Roots

- ✓ In the flow
- ✓ Fine & fibrous (less than thumb width)
- ✓ Individual fibers visible (not smothered)




Poor Roots
Larger than thumb or heavily smothered
Not in the water



Good Leaf Packs

- ✓ In the flow
- ✓ Partially decayed

Good Leaf Mats

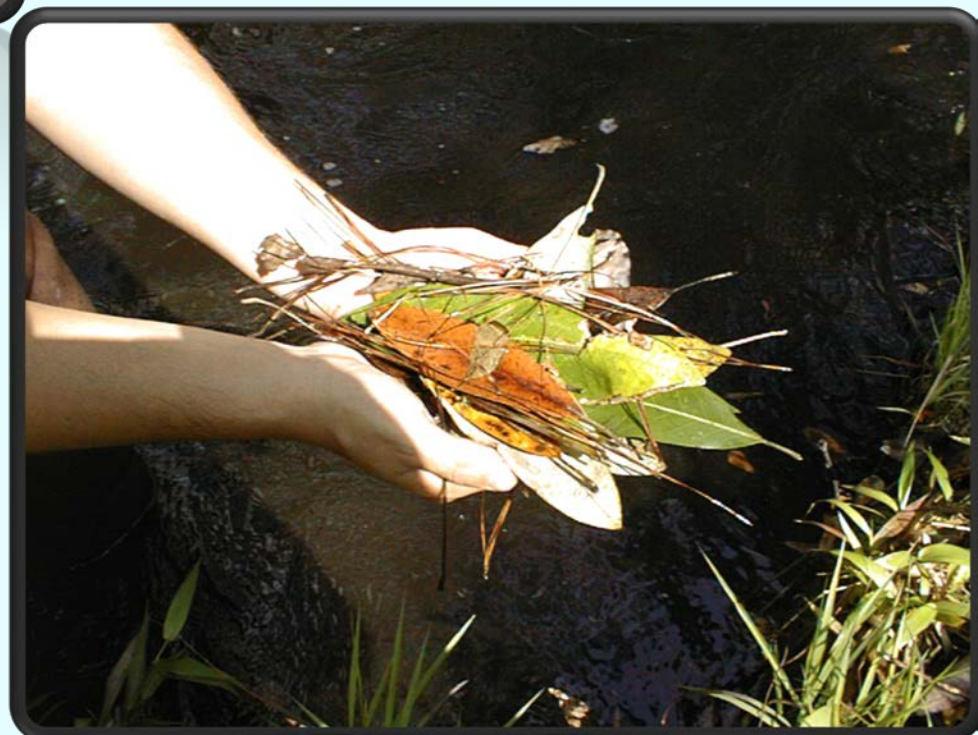
- ✓ In the flow
- ✓ Partially decayed
- ✓ Not smothered
- ✓ Sample the aerobic portion (top 2cm)

Poor Leaf Mats

- ✓ Silt-smothered
- ✓ Anaerobic

Poor Leaf Packs

- ✓ Fresh leaves
- ✓ Pine & cypress needles

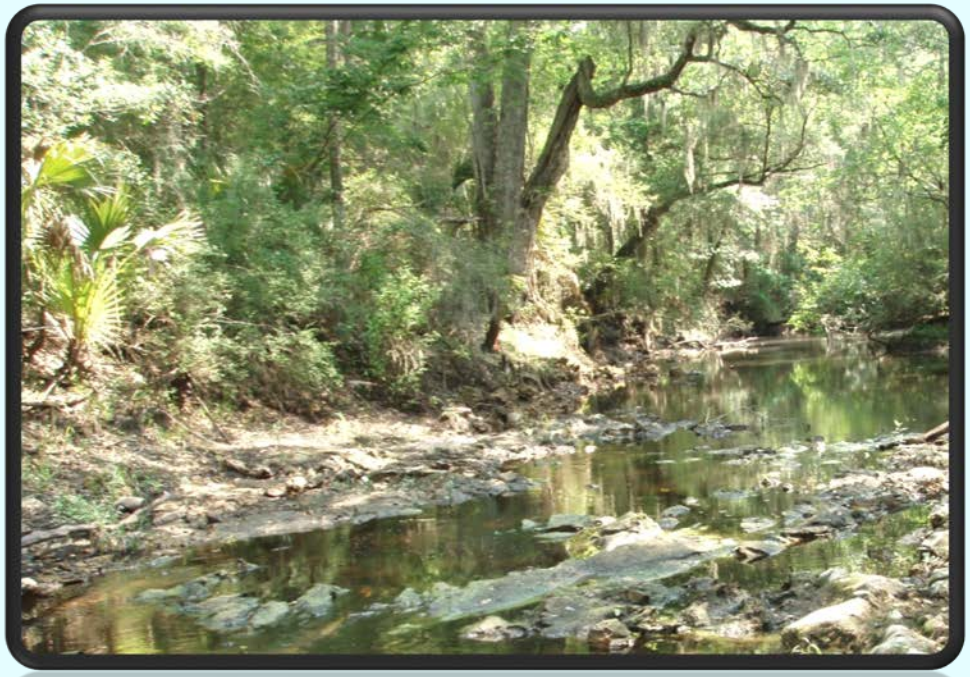


Good Aquatic Vegetation

- ✓ In the flow
- ✓ In contact with the water
- ✓ Structurally complex

Poor vegetation

- ✓ Out of the water
- ✓ Submersed terrestrial vegetation



Good Rock

- ✓ In the flow
- ✓ >5cm diameter
- ✓ Rough texture

Poor Rock

- ✓ Smooth
- ✓ Pebble-sized
- ✓ Clay
- ✓ Asphalt

2. Substrate Availability

- ✓ Only good quality habitat should be included in the mapping and scoring process
- ✓ Score is based on the sum of the percentages of productive habitats
- ✓ **Minimum of 2m^2** for each habitat type to be a major habitat
- ✓ Count the number of blocks for a given habitat type and divide it by the total number of blocks within the stream sketch

Substrate Availability ____	Greater than 30% major productive habitat present at site 20 19 18 17 16	16% to 30% major productive habitat, by aerial extent 15 14 13 12 11	6% to 15% major productive habitat 10 9 8 7 6	Less than 5% major productive habitat 5 4 3 2 1

3. Water Velocity

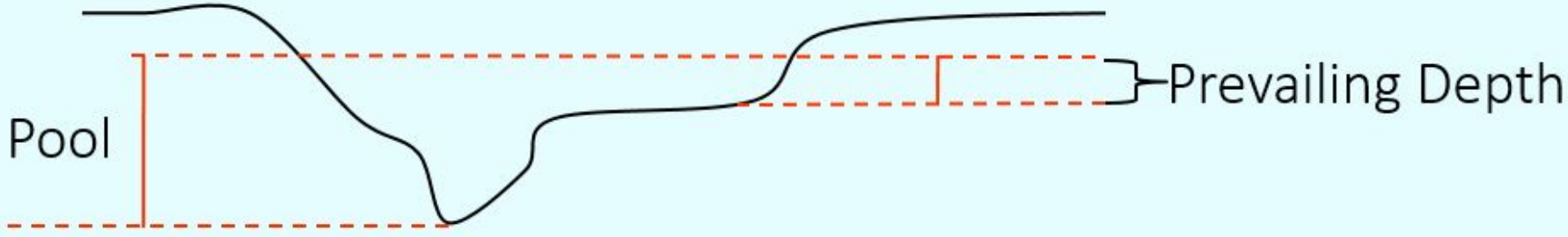
- ✓ Score based on the velocity at a typical cross section of stream
- ✓ Avoid areas immediately before or after snags and pools
- ✓ If too low: dissolved oxygen, food availability, and recruitment are reduced
- ✓ If too high: catastrophic drift, scouring of habitats

Water Velocity ____	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec					Max. observed at typical transect: >0.1 to 0.25 m/sec					Max. observed at typical transect: 0.05 to 0.1 m/sec					Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec				
	≥0.33	0.31	0.29	0.27	>0.25	0.25	0.21	0.17	0.13	>0.1	0.1	0.09	0.07	0.06	0.05	<0.05	0.04	0.03	0.01	<0.01
	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

4. Habitat Smothering

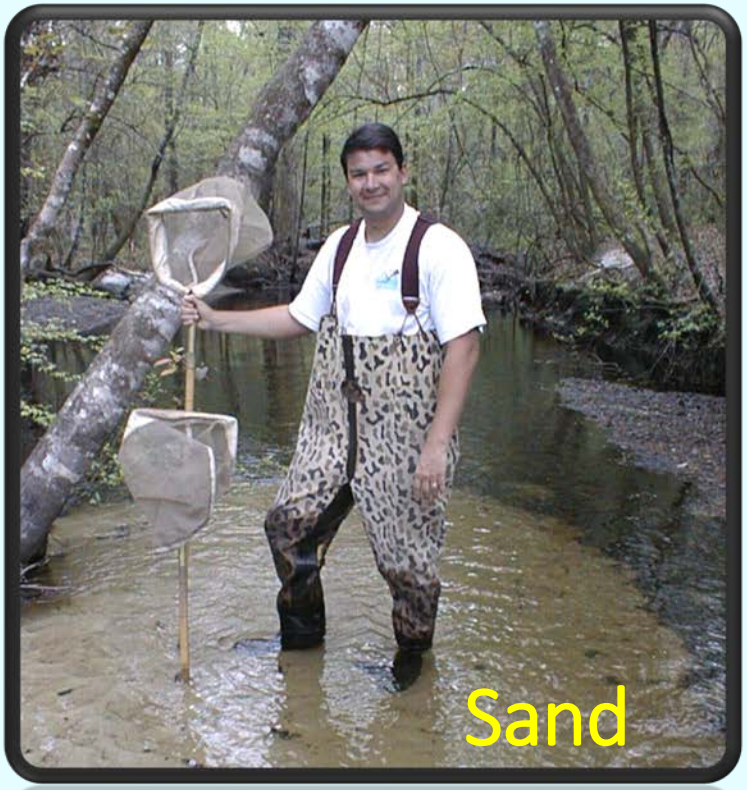
- ✓ Evaluates excess sand, silt, and algae on habitats (light covering is expected)
- ✓ Look for the presence of pools

  Pool = twice the prevailing depth; 1-2 pools for every 12 times stream width (*e.g.*, a 4 m wide stream should have 1-2 pools per 48 m or 2-4 per 100 m).



	Pools Present		Minimal	None
Habitat Smothering ____ - - - - - - - - - - - - - - - Primary Score ____	Adequate number of stable pools (1-2 per 12 times width) and <25% of habitats affected by sand, silt, or algae. 20 19 18 17 16	Adequate number of stable pools (1-2 per 12 times width) and >25% of habitats affected by sand, silt, or algae. 15 14 13 12 11	Does not have required number of stable pools (1-2 per 12 x width) and/or has shallow pools (<2 x prevailing depth). 10 9 8 7 6	Stable pools are absent. Most habitats affected by sand, silt, or algae accumulation. 5 4 3 2 1

Types of Smothering



5. Artificial Channelization

- ✓A measure of large-scale changes in the shape of the stream channel
- ✓Straightened, deepened, down-cut
- ✓Presence of spoil banks

Secondary Habitat Components **Artificial Channelization** ___	Expected sinuosity given the stream width. No evidence of dredging or artificial straight-ening. No spoil banks. 20 19 18 17 16	Good sinuosity within old chan-nelized area. Evidence of dredging in the past (>25 yrs) but mostly recovered. 15 14 13 12 11	Straightened with trapezoidal cross section, but has a small degree of sinuosity developed within channelized area. 10 9 8 7 6	Straightened or engineered by dredging, has trapezoidal or box cut cross section, lacks required pools. May have spoil banks. 5 4 3 2 1

Optimal Sinuosity

- ✓ No artificial straightening
- ✓ A diversity of depths
- ✓ No evidence of dredging
- ✓ No spoil banks

Erosion, transport, and deposition always occurring

- Outer banks erode
- Inner banks deposit

Secondary Component

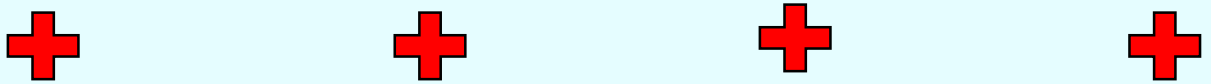
Artificial Channelization

Poor sinuosity

- ✓ Spoil banks
- ✓ Box-cut, monotypic depth
- ✓ Straightened

6. Bank Stability

- ✓Steep, unvegetated banks will erode and collapse (unstable).
- ✓Gently sloping banks, with woody vegetation or limestone, are most stable.
- ✓Evaluate banks on height, slope, armoring <u>compared to bankfull level</u>.

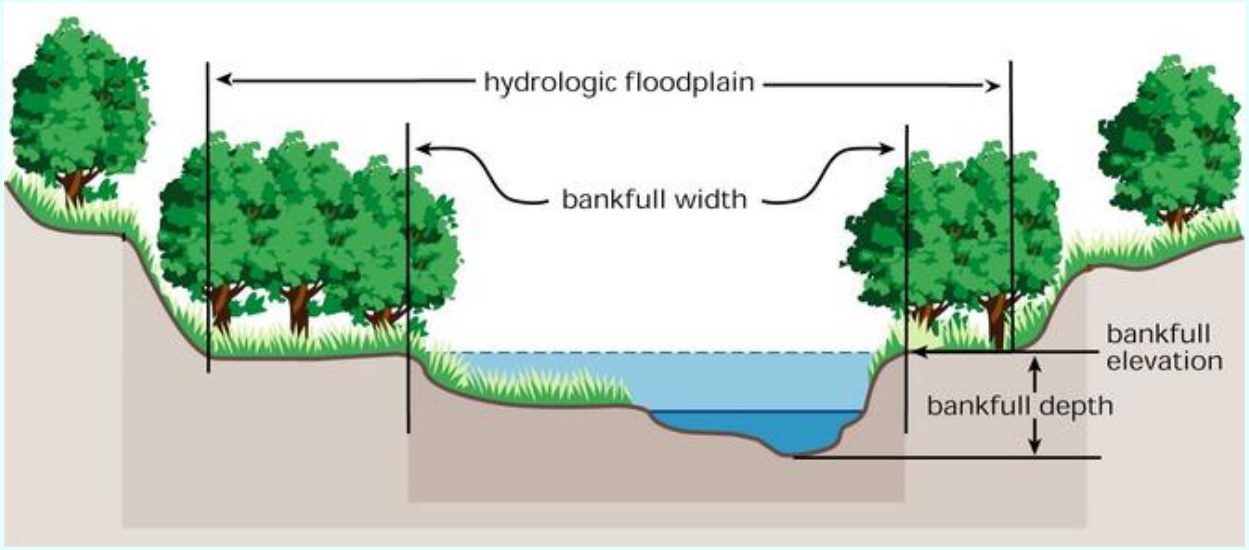


3 2 1 0

Bank Stability Right Bank ___ Left Bank ___	Bankfull > 60% of bank height. Slope of bank ≤ 60°. Bankfull is within or above the root zone with few raw, eroded areas. 10 9	Only meets 2 of the 3 requirements for optimal bank stability. 8 7 6	Only meets 1 of the 3 requirements for optimal bank stability. 5 4	Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas. 3 2 1

Determining Bankfull Level

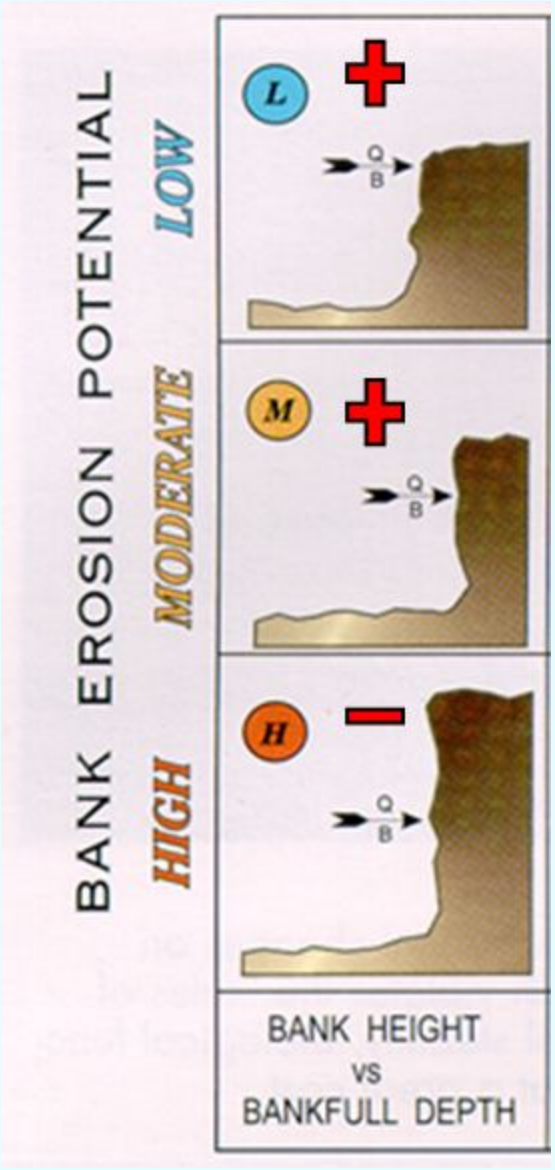
- ✓ In natural systems, it is the water level where channel maintenance is most effective.
- ✓ It is also the “ordinary high water level”.



Bank Height

Determine bankfull, relative to bank height

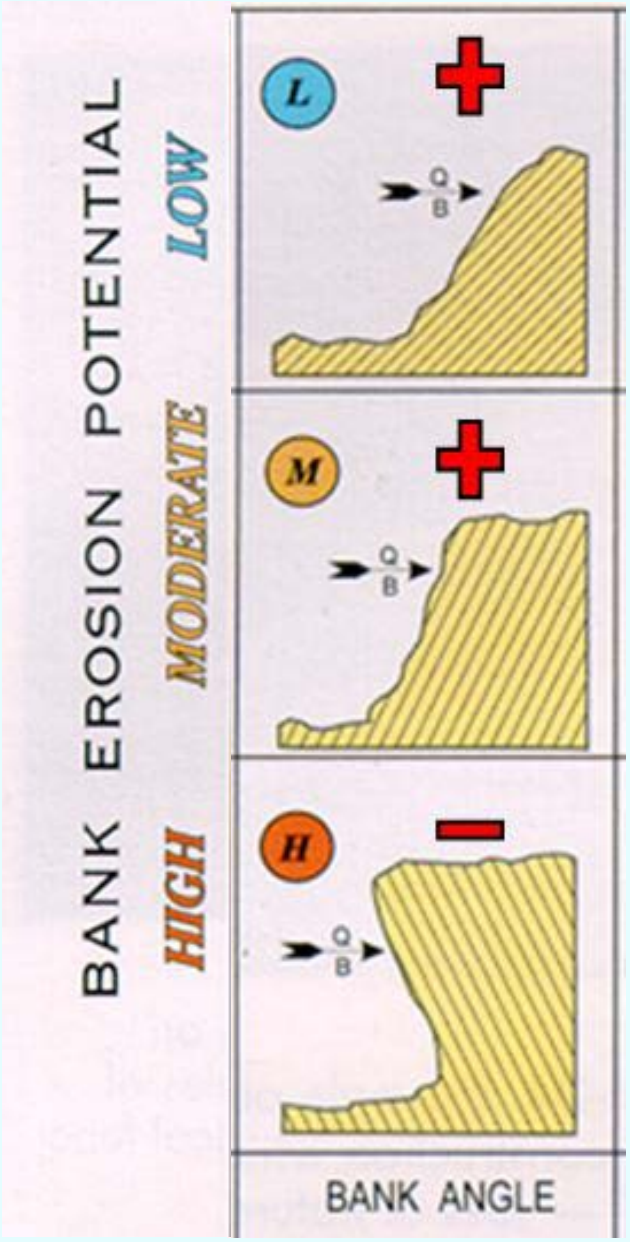
- If bankfull is > 60% of bank height = +
- If bankfull is < 60% of bank height = −



Bank Slope

Determine bankfull, relative to bank slope

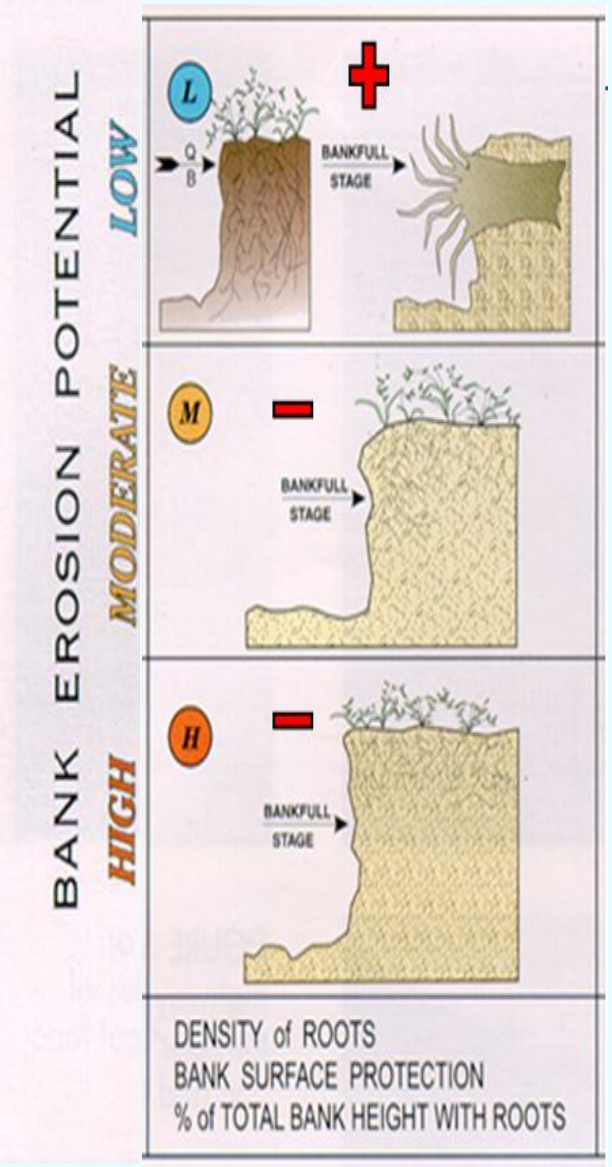
- Bank angle is ≤ 60º = +
- Bank angle is > 60º = –

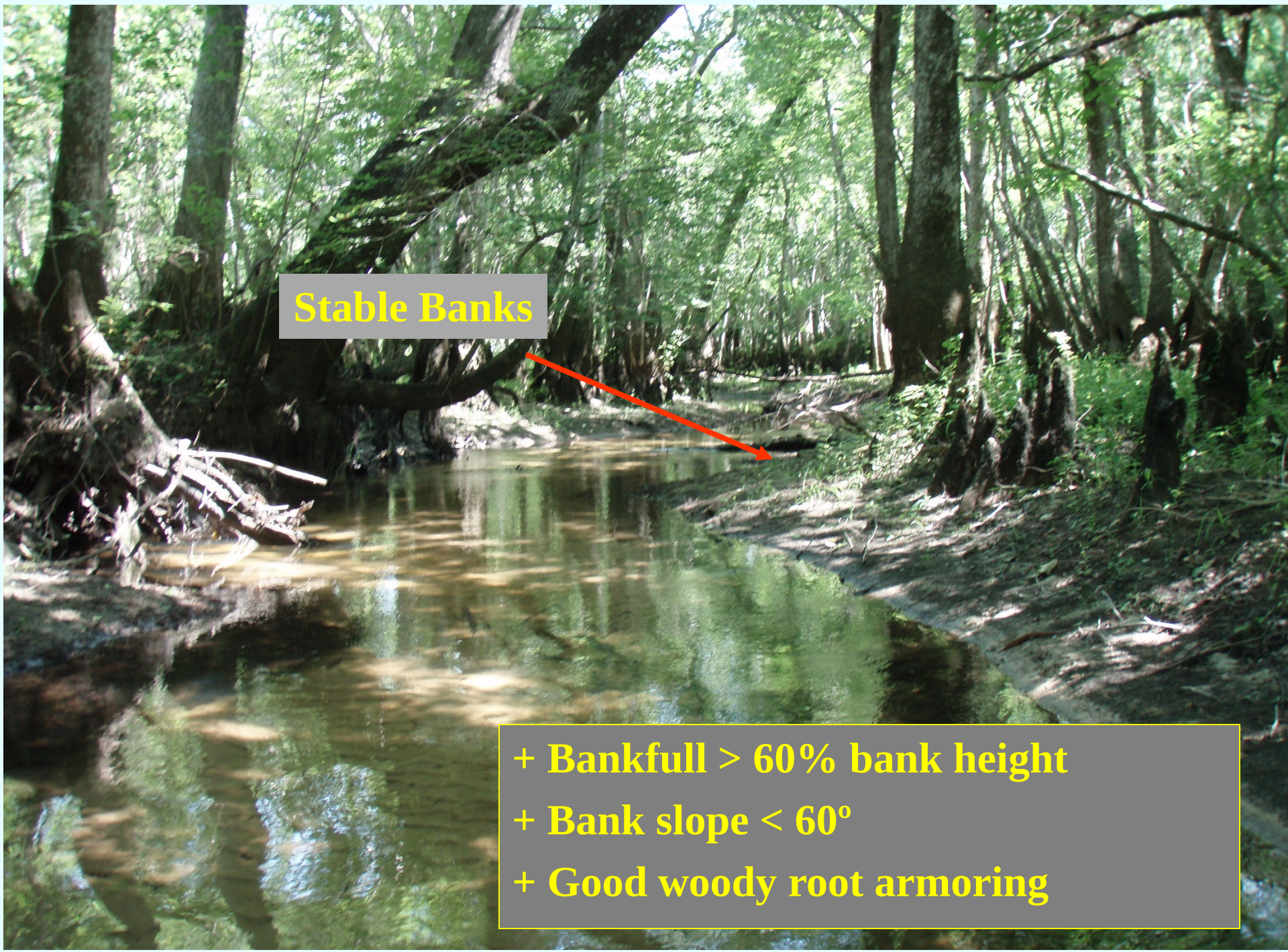


Bank Armoring

Determine bankfull, relative to bank armoring

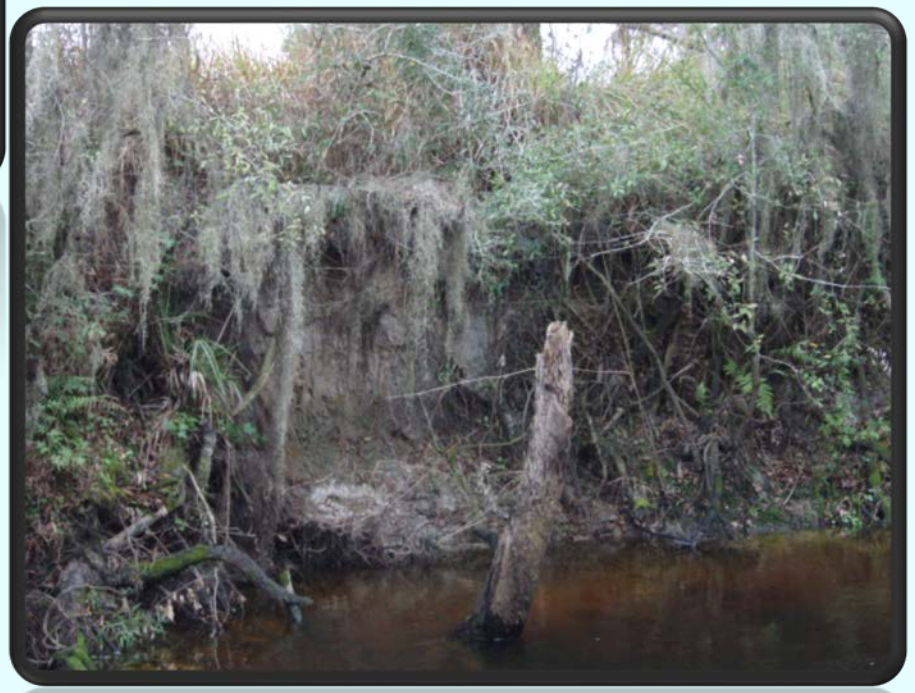
- Woody root zone covers >60% of bank; few raw, eroded areas = +
- Woody root zone cover <60% of bank; large raw, eroded areas = –




Stable Banks
+ Bankfull > 60% bank height
+ Bank slope < 60º
+ Good woody root armoring

Unstable Banks

- ✓ Bank full <60% of slope
- ✓ Bank slope >60°
- ✓ Raw, eroded areas, not well armored



7. Riparian Buffer Zone Width

- ✓ Measured from the edge of the stream bank to where clearing or other adverse human activities begin.
- ✓ A vegetated buffer zone of greater than 18 m (approximately 60 feet) is currently considered optimal.

Riparian Buffer Zone Width Right Bank ____ Left Bank ____	Width of vegetation greater than 18 m 10 9	Width of vegetation >12 to 18m 8 7 6	Width of vegetation 6 to 12 m. human activities close to system 5 4	Less than 6 m of buffer zone due to intensive human activities 3 2 1

Good Buffer Width

>18m natural expected vegetation

Poor Buffer Width

<6m expected vegetation

8. Riparian Zone Vegetation Quality

- ✓ Be familiar with native plant communities in the area where you are sampling
- ✓ Be familiar with exotic plant species in the area
- ✓ Based on how closely the plant community at the site approaches that expected of an undisturbed community in the region
- ✓ A typical optimal riparian zone typically has an understory, mid-story, and over-story of native plant species

Riparian Zone Vegetation Quality Right Bank ___ Left Bank ___ ---------- ---------- Secondary Score _____	Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants; tree, shrub, and forbs represented, if appropriate). Minimal disturbance. 10 9	>50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed. 8 7 6	25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious. 5 4	Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). 3 2 1


Good Riparian Vegetation

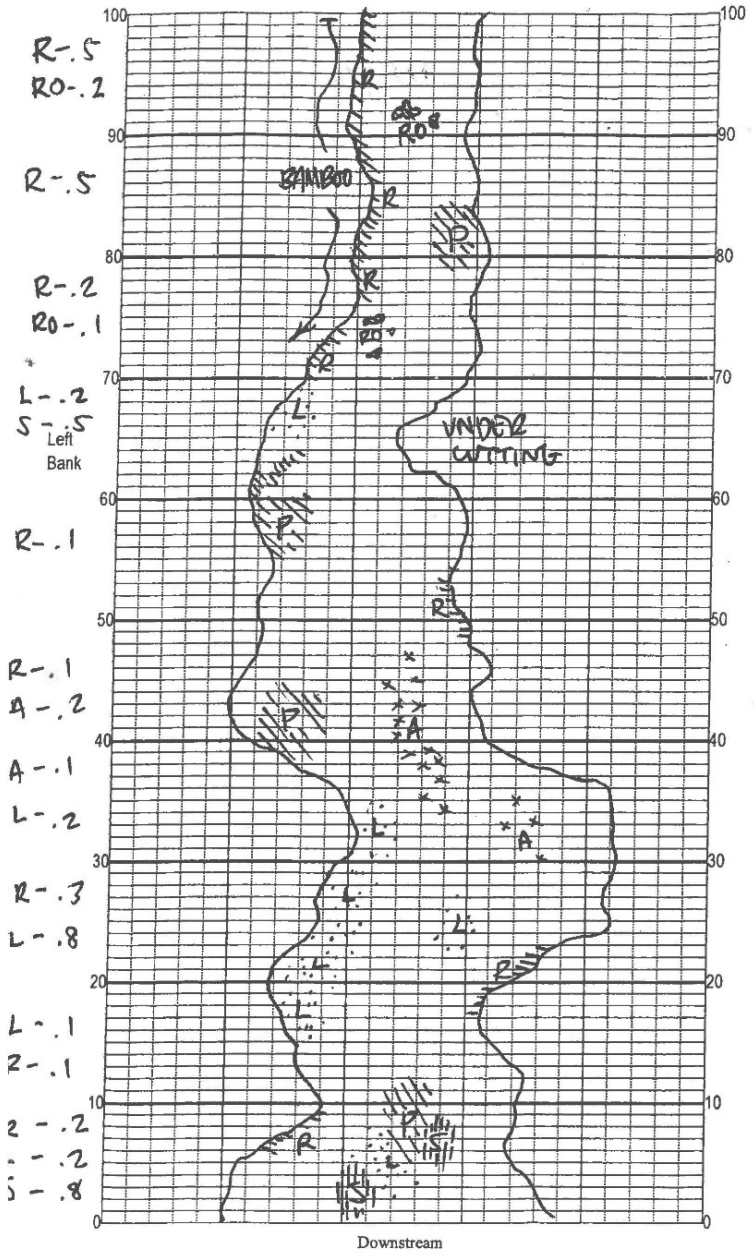
Poor Riparian Vegetation

Wild taro (*Colocasia esculenta*)

Coral ardisia (***Ardisia crenata***)

Cogon grass (*Imperata cylindrica*)

DEP Form FD 9000-4 Stream/River Habitat Assessment Sketch Sheet



Downstream

Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Location: Holiday Springs

Date: Aug 1, 2014

Sampler: _____

100 m: Latitude	
Longitude	
0 m: Latitude	
Longitude	

Substrates: Code key, draw proportionate habitat abundance.		%
S	Snags	
R	Roots/undercut banks	
L	Leaf Packs (or mats)	
A	Aquatic Macrophytes	
RO	Rocks	
P	Pools	total # observed = ____ # range expected = ____

Average width 3 m

Average depth _____ m

Velocity measured at _____ meter mark.

WQ & chemistry taken at 100 meter mark.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed / other notes:

S - 1.3
R - 2.0
L - 1.5
A - .3
RO - .3

Summary of Steps